IAN C BOURG
Earth Sciences Division, Lawrence Berkeley National Laboratory
1 Cyclotron Road, MS 84-0171, Berkeley, CA 94720-8268
Ph.: (510) 486-7393, Fax: (510) 486-5686, Email: icbourg@lbl.gov
http://esd.lbl.gov/about/staff/ianbourg

EDUCATION

National Institute of Applied Sciences, Toulouse, France. Chemical Engineering, BEng, 1999.
National Institute of Applied Sciences, Toulouse, France. Chemical Engineering, MSc, 1999.
Thesis advisor: HA Jakobsen (Norwegian University of Science and Technology)
University of California, Berkeley, CA. Civil and Environmental Engineering, PhD, 2004.
Advisor: G Sposito.

APPOINTMENTS

2009-present **Scientist (career-track)**, Earth Sciences Division, Lawrence Berkeley National Laboratory.
2008 **Visiting Postdoctoral Fellow**, Department of the Geophysical Sciences, University of Chicago. *Collaborators: FM Richter, G Sposito.*
2005-2009 **Postdoctoral Fellow**, Earth Sciences Division, Lawrence Berkeley National Laboratory. *Collaborators: G Sposito, CI Steefel, FM Richter.*

BOOKS

Smit, B, JA Reimer, CM Oldenburg, **IC Bourg**. *Introduction to Carbon Capture and Sequestration*, The Berkeley Lectures on Energy, Vol. 1, Imperial College Press (2014).

DePaolo, DJ, DR Cole, A Navrotsky, **IC Bourg** (Eds.) *Geochemistry of Geologic CO_2 Sequestration*, Reviews in Mineralogy and Geochemistry, Vol. 77, Mineralogical Society of America (2013).

PEER-REVIEWED PAPERS AND BOOK CHAPTERS

Eiler, JM, B Bergquist, **IC Bourg,** P Cartigny, J Farquhar, AC Gagnon, W Guo, I Halevy, AE Hofmann, N Levin, EA Schauble, D Stolper. Frontiers of stable isotope geoscience. *Chem. Geol.* 372:119-143 (2014).

Holmboe, M, **IC Bourg**. Molecular dynamics simulations of water and sodium diffusion in smectite interlayer nanopores as a function of pore size and temperature. *J. Phys. Chem. C* 118:1001-1013 (2014).

Hamm, LM, **IC Bourg**, AF Wallace, B Rotenberg. Molecular simulation of CO_2- and CO_3-brine-mineral systems. In: *Geochemistry of Geologic CO_2 Sequestration* (DJ DePaolo, DR Cole, A Navrotsky, & IC Bourg, eds.), Reviews in Mineralogy and Geochemistry, Vol. 77, pp. 189-228, Mineralogical Society of America (2013).

Hofmann, AE, **IC Bourg**, DJ DePaolo. Ion desolvation as a mechanism for kinetic isotope fractionation in aqueous systems. *Proceedings of the National Academy of Sciences of the USA*, 198:18689-18694 (2012).

Nielsen, LC, **IC Bourg**, G Sposito. Predicting CO_2-water interfacial tension under pressure and temperature conditions of geologic CO_2 storage. *Geochimica et Cosmochimica Acta* 81:28-38 (2012).

Bourg, IC, CI Steefel. Molecular dynamics simulations of water structure and diffusion in silica nanopores. *Journal of Physical Chemistry C* 116:11556-11564 (2012).

Bourg, IC, G Sposito. Molecular dynamics simulations of the electrical double layer on smectite surfaces contacting concentrated mixed electrolyte (NaCl-$CaCl_2$) solutions. *Journal of Colloid and Interface Science* 360:701-715 (2011).

Bourg, IC, G Sposito. Ion exchange phenomena. In: *Handbook of Soil Science*, *Properties and Processes*, 2nd ed. (PM Huang, Y Li, & ME Sumner, eds.), CRC Press, Boca Raton, Chapter 16 (2011).

Bourg, IC, G Sposito. Connecting the molecular to the continuum scale for diffusion processes in smectite-rich porous media. *Environmental Science and Technology* 44:2085-2091 (2010).

Bourg, IC, FM Richter, JN Christensen, G Sposito. Isotopic mass-dependence of metal cation diffusion coefficients in liquid water. *Geochimica et Cosmochimica Acta* 74:2249-2256 (2010).

Bourg, IC, G Sposito, ACM Bourg. Modeling the diffusion of Na^+ in compacted water-saturated Na-bentonite as a function of pore water ionic strength. *Applied Geochemistry* 23:3635-3641 (2008).

Bourg, IC, G Sposito. Isotopic fractionation of noble gases by diffusion in liquid water: Molecular dynamics simulations and hydrologic applications. *Geochimica et Cosmochimica Acta* 72:2237-2247 (2008).

Bourg, IC, G Sposito, ACM Bourg. Modeling the acid-base surface chemistry of montmorillonite. *Journal of Colloid and Interface Science* 312:297-310 (2007).

Bourg, IC, G Sposito, ACM Bourg. Modeling cation diffusion in compacted water-saturated sodium bentonite at low ionic strength. *Environmental Science and Technology* 41:8118-8122 (2007).

Bourg, IC, G Sposito. Molecular dynamics simulations of kinetic isotope fractionation during the diffusion of ionic species in liquid water. *Geochimica et Cosmochimica Acta* 71:5583-5589 (2007).

Bourg, IC, G Sposito, ACM Bourg. Tracer diffusion in compacted, water-saturated bentonite. *Clays and Clay Minerals* 54:363-374 (2006).

Bourg, IC, ACM Bourg, G Sposito. Modeling diffusion and adsorption in compacted bentonite: a critical review. *Journal of Contaminant Hydrology* 61:293-302 (2003).

Jakobsen, HA, **I Bourg**, KW Hjarbo, HF Svendsen. Interaction between reaction kinetics and flow structure in bubble column reactors. In: *Parallel Computational Fluid Dynamics – Trends and Applications*, Elsevier, 543-550 (2001).

TEACHING EXPERIENCE

Lecturer, University of California, Berkeley (3 semesters)
Carbon Capture and Sequestration, Fall 2011, Spring 2013, Spring 2014 (Lead Instructor: B Smit).

Graduate Student Instructor, University of California, Berkeley (3 semesters total)
Water Chemistry, Fall 2003 (Instructor: SW Hermanowicz).
Environmental Engineering, Spring 2002 (Instructor: WW Nazaroff), Spring 2003 (Instructor: WJ Riley).

HONORS & AWARDS

Winner, US DOE Life at the Frontiers of Energy Research Video Competition, for the video *Carbon in Underland* (2011).

Doctoral Fellowships (Joseph Dias fellowship, Eugene Henry fellowship), Environmental Engineering Group, UC Berkeley (2000, 2002).

Doctoral Fellowship, French Agency for the Management of Radioactive Waste (ANDRA) (1999-2002).

Leonardo Scholarship for research abroad, European Union (1999).

PROFESSIONAL ASSOCIATIONS

American Chemical Society (ACS), American Geophysical Union (AGU), Clay Minerals Society (CMS), Mineralogical Society of America (MSA).

INVITED PRESENTATIONS

Plenary keynote presentation

2012 – 5th International Meeting on Clays in Natural and Engineered Barriers for Radioactive Waste Confinement (Montpellier, France).

Invited talks at conferences, symposia, and workshops

2014 – 2 invited talk: CMS meeting (College Station, TX – two talks).
2013 – 1 invited talk: ACS meeting (New Orleans).
2012 – 3 invited talks: International Seminar Series on Environmental Radioactivity (Hokkaido University); APS workshop on Metal Ion Adsorption at Interfaces (Argonne National Laboratory); 2012 Young Engineers & Scientists Symposium (Berkeley).
2011 – 3 invited talks: Symposium on Application of Nano-geosciences in Petroleum Engineering (Kyoto University); Goldschmidt conference (Prague); EFRC Summit and Forum (Washington DC).
2010 – 1 invited talk: DOE workshop on the Chemistry of Novel Isotope Effects in the Geosciences (San Francisco).
2009 – 1 invited talk: ACS meeting (Salt Lake City).
2007 – 3 invited talks: DOE Workshop on Molecular Dynamics and Structure of Geofluids (Berkeley); European Union workshop on Surface Reactions & Electrical Interfacial Layer (Opatjia, Croatia); Workshop on Environment, Neutrons and Molecular Dynamics (University of Grenoble).
2005 – 2 invited talks: International Workshop on Waste Management (Hokkaido University); International Clay Conference (Tokyo).

SERVICE AND OUTREACH

Organization of international workshops and short courses

Geochemistry of geologic CO_2 sequestration. Mineralogical Society of America (MSA) short course organized in Berkeley. Co-conveners: DJ DePaolo, DR Cole, A Navrotsky (2013).
Microscopic-scale view of CO_2 sequestration. Workshop organized with support from the European Center for Atomistic and Molecular Modeling (CECAM) in Lausanne, Switzerland. Co-convener: B Rotenberg (2011).

Organization of conference sessions

ACS meeting (2014).
AGU meeting (2008, 2010).
Goldschmidt conference (2009 – two sessions).

Reviewing

Reviewer of 73 manuscripts for *Geochimica et Cosmochimica Acta* (24), *Environmental Science and Technology* (15), and other journals.
Reviewer of five proposals for the US DOE, the NSF, the Swiss NSF, the German Research Foundation (DFG), and the Portuguese Science and Technology Foundation (FCT).

Academic committees

Doctoral dissertation qualifying examination committee for LC Nielsen (2010).

Editorial work

Editor of the bi-monthly CMS News page published by the Clay Minerals Society in the journal *Elements* (since 2013).